CLAIMS

1. A needle valve for filling a mold with an organic material in the liquid state, said valve including:

- a body (25) in which is formed a flow passage (30) for the material to be molded having an inlet opening (31), an outlet opening (32) and, between said two openings, a constriction (33) bounded on its upstream side by a change of section (34) forming a seat, and

- a needle (40) mounted in the body (25) so that it is mobile between a fully open position and a closure position closing the flow passage (30) with, between these two extreme positions, a range of intermediate positions of variable opening, said needle having a closure shoulder (43) adapted to bear in the closure position against the seat formed by the change of section (34) in the flow passage (30) in the body (25), so as to shut off the flow passage (30) and, projecting from said closure shoulder, an opening adjustment tip (42) that has a nonuniform section and is engaged in the constriction (33) to define a certain flow section therewith in each intermediate position of the needle (40).

2. A valve according to claim 1, wherein the closure shoulder (43) of the needle (40) is rounded.

3. A valve according to the preceding claim, in which the change of section (34) of the flow passage (30) is conical.

4. A valve according to the preceding claim, wherein the conical change of section (34) has an angle at the apex from 30 to 60°.

5. A valve according to any preceding claim, wherein the tip (40) has a rounded free end (46).

6. A valve according to the preceding claim, wherein the free end (46) of the tip is spherical.

7. A valve according to any preceding claim, wherein, in the maximum open position, the free end (46) of the tip (42) is at least partially engaged in the constriction (33) of the flow passage (30).

8. A valve according to any preceding claim, wherein the tip (40) has at least one conical portion.

9. A valve according to any preceding claim, wherein the tip has a plurality of portions of different shape with no first order discontinuity between the portions.

10. A valve according to claims 8 and 9, wherein the tip has at least one cylindrical portion in addition to its conical portion.

11. A valve according to any preceding claim, in which at least the portion of the external surface of the needle (40) that is caused to be immersed in the flow passage (30) consists of PTFE.

12. A valve according to any preceding claim, wherein the inside surface of the flow passage (30) of the body (25) consists of PTFE.

13. A valve according to any preceding claim, wherein the needle (40) has an axis (11) of rotational symmetry and is mounted in the body (25) to slide along its axis, which coincides with the axis of the constriction (33) in the flow passage (30) of the body (25).

14. A valve according to the preceding claim, wherein an ethylene-propylene-diene elastomer O-ring seal (44) is mounted between the body (25) and the needle (40).

15. A valve according to any preceding claim, wherein the constriction (33) in the flow passage (30) is extended with a constant shape and size of section as far as the outlet orifice (32).

16. A valve according to any preceding claim,

wherein the flow passage (30) is L-shaped, with a first branch centered on the flow axis (11) and whose free end constitutes the outlet opening (32) and a second branch centered on an axis (35) perpendicular to the flow axis (11).

17. A valve according to the preceding claim, wherein the first branch of the passage (30) is staggered, with a large base (36) and, at the end, the constriction (33) followed by the outlet opening (32), the base (36) and the constriction (33) being cylindrical and the change of section (34) merging with the constriction (33) and the base (36) via rounded connecting areas.

18. A method of molding an organic material optical component in an appropriate molding cavity (6), the method including a sequence of filling the molding cavity with the organic material in the liquid state and a step of polymerizing the material in said molding cavity, which method is characterized in that the molding cavity (6) filling sequence is effected by means of a valve (15) according to any preceding claim.

19. A method according to the preceding claim wherein the position of the needle (40) is controlled.

20. The method according to claim 18 wherein the speed of the needle (60) is controlled.

21. A method according to the preceding claim wherein the needle is operated at different speeds during opening and during closing.

22. A method according to the preceding claim wherein the needle is moved during closing at a speed higher than that at which it is moved during opening.

23. A method according to any of claims 18 to 22, wherein the filling sequence includes the following steps:

- rise in flowrate (A) from a zero flowrate to a

nominal flowrate (Dn) greater than 40 g/min,

- full flowrate filling (B), with the nominal flowrate (Dn) maintained, and

- flowrate reduction (C) from the nominal flowrate (Dn) to the zero flowrate,

which method is characterized in that the rise in flowrate step (A) is divided into at least two phases:

- a low flowrate start of filling phase (A1), which continues until the mold is filled with the material to a height of at least 2 mm at the deepest point of the mold, the flowrate increasing during this phase to a maximum start of filling flowrate (Dd) less than 20 g/min, and then

- a main rise in flowrate phase (A2) to increase from the start of filling flowrate (Dd) to the nominal flowrate (Dn).

24. A method according to any of claims 18 to 23, wherein the material is introduced into the molding cavity (6) via an orifice (9) in the lower portion of said cavity.

25. A method according to any of claims 18 to 24, wherein polymerization of the material is initiated immediately after complete filling of the molding cavity.